

REMARKS

Reconsideration of the application as amended is respectfully requested.

The Examiner's communication dated June 6, 2006, which includes making the restriction requirement final, is acknowledged.

Regarding the election of species requirement, however, applicants respectfully reiterate for the record that the election of species requirement was improper because the species identified by the Examiner were not mutually exclusive. This is not to say that the species are not patentably distinct. Applicants affirm that the species as defined by the Examiner are patentably distinct.

MPEP 806.04(f) requires that the species of an election requirement be mutually exclusive. The plain meaning of "mutually exclusive" requires that one species *may not include* another species. A species defined as comprising a first element *always includes* a species defined as comprising the first element and a second element because the latter species is a subspecies of the former. In the present case (referring to the species A, B, and C defined by the Examiner), species B is a subspecies of species A, and therefore, species A includes species B. Similarly, species C is a subspecies of species A, and therefore, species A includes species C. Thus, logically, since one species includes the other, the species A, B, and C defined by the Examiner are not mutually exclusive as required by MPEP 806.04(f).

Therefore, applicants respectfully request withdrawal of the finality of the restriction requirement at least with respect to the associated election-of-species requirements. Applicants respectfully request reconsideration of those requirements and request grouping together of at least those species that are not mutually exclusive as required by MPEP 806.04(f).

Claims 1 – 66 are pending. Of these, claims 2, 11 – 25, 37 – 39, 41 – 43, and 51 – 56 are withdrawn from consideration under the restriction and election-of-species requirements. Claims 1, 4 – 5, 31, 36, and 40 stand rejected as anticipated under 35 USC § 102. Claims 3, 6 – 8, 26 – 30, 32 – 35, and 44 – 50 stand rejected for obviousness under 35 USC § 103.

By the present amendment, claims 1 and 44 are amended. After this amendment, claims 1 – 66 are pending, and claims 2, 11 – 25, 37 – 39, 41 – 43, and 51 – 56 remain withdrawn from consideration.

Rejections under 35 USC § 102 traversed

Claims 1, 4 – 5, 31, 36, and 40 stand rejected under 35 USC § 102(e) as anticipated by Enokido et al., published U.S. patent application 2004/0255841. These rejections are respectfully traversed.

Claim 1 is amended to more clearly state and distinctly claim what the applicants believe to be their invention. Claim 1 as amended recites, in pertinent parts (emphasis added):

“b) urging the slurry through an orifice *while forcing the particles and precursor material into a combination having a desired crystallographic configuration;*” and

“c) drying the combination *having a desired crystallographic configuration* emerging from the orifice”.

Basis for the amendments to claim 1 are found in FIG. 1 (S40), in applicants' specification as filed in paragraphs [0021] and [0027], and in FIGS. 2B – 2D and 3B, for example. Examples of desired crystallographic configurations (e.g., hexagonal-close-packed or face-centered-cubic crystallographic configurations) are described in the same paragraphs.

Neither Enokido et al. nor the material incorporated by reference from Sachs et al. discloses *forcing the particles into a combination having a desired crystallographic configuration* by urging their slurry through an orifice. Therefore, claim 1 is clearly distinguished from Enokido et al.

Dependent claims 4 – 5, 31, 36, and 40 inherit all the limitations of claim 1. Therefore, each of these dependent claims is also clearly distinguished from Enokido et al.

Regarding dependent claim 40 In particular, claim 40 recites: "The method of claim 1, wherein the photonic-crystal filament has a longitudinal axis and a selected crystallographic axis of the desired crystallographic configuration is aligned parallel to the longitudinal axis of the photonic-crystal filament." The Examiner states that FIG. 8, item 61 of Enokido et al. teaches the limitations of claim 40. However, item 61 is merely a binder (paragraph [0103] of Enokido et al.); it is neither a photonic-crystal filament nor a desired crystallographic configuration. Thus, neither that figure nor the associated specification of Enokido et al. teaches the subject matter of applicants' claim 40.

For all of these reasons, applicants respectfully request that the rejections under 35 USC § 102(e) of claims 1, 4 – 5, 31, 36, and 40 be withdrawn and respectfully request that these claims be allowed.

Rejections under 35 USC § 103 traversed

Claims 3, 8, 29 – 30, 32, 44 – 48, and 50 stand rejected under 35 USC § 103(a) as being unpatentable over Enokido et al., US 2004/0255841. These rejections are respectfully traversed.

In each of these obviousness rejections, the Examiner states that Enokido et al. discloses the method of claim 1 and then discusses the supposed obviousness of each dependent claim. The premise that Enokido et al. discloses the method of claim 1 is traversed hereinabove in the discussion of rejections under 35 USC § 102(e), where it has been shown that claim 1 is clearly distinguished from Enokido et al. Dependent claims 3, 8, 29 – 30, and 32 inherit all the limitations of their parent independent claim 1. Therefore, for the same reasons stated above, applicants respectfully request that all of these rejections under 35 USC § 103(a) be withdrawn.

Specifically regarding claim 3, the Examiner correctly states that Enokido et al. does not disclose the step of: e) compressing the slurry as claimed by applicants. However, the Examiner goes on to state that "in order for the slurry [of Enokido et al.] to fit through the print heads, it would have to be compressed or reduced, as claimed by Applicant." There is no basis for this assertion by the Examiner anywhere in Enokido et al. nor in the material incorporated by reference from Sachs et al. Perhaps the Examiner is relying upon personal knowledge in making this assertion; if so, an affidavit under 37 CFR §1.104 (d)(2) is respectfully requested. The same reasoning applies to the rejection of claim 46. Here again, there is no indication in Enokido et al. or in material incorporated by reference that a slurry would not fit through anything unless it were compressed.

Specifically regarding claim 8, the Examiner correctly states that Enokido et al. does not disclose the step of: g) reducing the precursor material to metallic form. However, the Examiner goes on to state that Enokido et al., at paragraph 30, discloses a slurry in metallic form and "hence, it would have been obvious ... that the precursor would be of metallic form, since the slurry is as well." Firstly, Enokido et al., at paragraph 30, says nothing about the slurry being in metallic form. The only mention of metals in Enokido et al. is in a list of examples of materials capable of being in slurry (paragraph 39). Nowhere does Enokido et al. mention any precursor material nor any need or desire to reduce any precursor material. It is well-established law that the combination must be suggested by the references. Thus, the Examiner's assertion that the subject matter of claim 8 would be obvious to one having ordinary skill in the art at the time the invention was made is unsupported by the record. The same reasoning applies to the rejections of claims 29, 30, and 50, all of which, like claim 8, use a precursor material in dependent claims that depend upon claim 1, previously distinguished from Enokido et al.

Regarding claim 32 specifically, the Examiner correctly states that Enokido et al. does not disclose non-spherical particles, but then goes on to state that it would have been obvious to change the shape of a particle to be

non-spherical. There is no basis for this assertion by the Examiner anywhere in Enokido et al. nor in the material incorporated by reference from Sachs et al. Again, the suggestion for the combination is not found in the references themselves. Perhaps the Examiner is relying upon personal knowledge in making this assertion of obviousness; if so, an affidavit under 37 CFR §1.104 (d)(2) is respectfully requested.

Specifically regarding claim 44, this claim is amended herein to more clearly state and distinctly claim what the applicants believe to be their invention. Claim 44 as amended recites: "A method of cladding a metal filament, the method comprising the steps of:

- a) providing a metal filament;
- b) mixing a slurry comprising particles of substantially uniform size and a precursor material for a desired metal;
- c) urging the metal filament and the slurry through an orifice while forcing the particles and precursor material into a combination having a desired crystal configuration surrounding the metal filament;
- d) drying the combination having the desired crystallographic configuration emerging from the orifice;
- e) sintering the precursor material; and
- f) compressing the precursor material within a sheath, while drawing the filament and sheath through a series of two or more successively smaller dies, whereby the filament is clad with a photonic crystal."

Basis for the amendments to claim 44 is found in FIG. 1 (S40), in applicants' specification as filed in paragraphs [0021] and [0027], and in FIGS. 2B – 2D, for example. Further basis for the insertion of the limitation "and sheath" is found specifically in FIG. 3B and paragraphs [0031 – 0032] as filed. Neither Enokido et al. nor the material incorporated by reference discloses *forcing the particles into a combination having a desired crystallographic configuration* by urging the *metal filament and slurry* through an orifice, nor *compressing the precursor material within a sheath, while drawing the filament and sheath through a series of two or more successively smaller*

dies. Therefore, claim 44 is clearly distinguished from Enokido et al. Dependent claims 44 – 48 and 50 inherit all the limitations of their parent independent claim 44. Claims 46 and 50 specifically are also discussed hereinabove. Therefore, applicants respectfully submit that claims 44 – 48 and 50 are also not obvious in view of Enokido et al.

For all of these reasons, applicants respectfully request that the rejections under 35 USC § 103(a) of claims 3, 8, 29 – 30, 32, 44 – 48, and 50 be withdrawn and respectfully request that these claims be allowed.

Claims 6 – 7, 26 – 28, 33 – 35, and 49 stand rejected under 35 USC § 103(a) as being unpatentable over Enokido et al. (2004/0255841) in view of Fleming et al. (US 6,7698,256). These rejections are respectfully traversed. Dependent claims 6 – 7, 26 – 28, and 33 – 35 depend upon claim 1. The premise that Enokido et al. discloses the method of claim 1 is traversed hereinabove in the discussion of rejections under 35 USC § 102(e), where it has been shown that claim 1 is clearly distinguished from Enokido et al. Dependent claim 49 depends upon independent claim 44. The premise that Enokido et al. discloses the method of claim 44 is traversed hereinabove in the discussion of other rejections under 35 USC § 103, where it has been shown that claim 44 is clearly distinguished from Enokido et al. Thus, all these claims 6 – 7, 26 – 28, 33 – 35, and 49 have been distinguished clearly from Enokido et al.

Furthermore, specifically regarding claims 6, 33, 34, and 35, the Examiner correctly states that Enokido et al. does not disclose particles comprising an inert material (claim 6) or a polymer (claim 33) or polymer nanospheres (claim 34) or polymer particles selected from a claimed Markush list (claim 35). Regarding claim 6, the Examiner states: "Fleming is cited to show a photonic crystal with particles comprising silicone, an inert material (col. 5, lines 53 – 56)." Regarding claim 33, the Examiner states: "Fleming is cited to show a photonic crystal with particles comprising silicone, a polymer (col. 5, lines 53 – 56)." However, Fleming et al. does not disclose the use of inert silicone particles or a silicone polymer or polymer particles. The material

disclosed by Fleming et al. (col. 5, lines 53 – 56), is not silicone, but the element silicon, which is disclosed in Fleming et al., not as inert particles or as a polymer, but as a complete photonic crystal structure, citing publications by Lin et al. Silicon is not an inert material; it reacts chemically with many other substances, including oxygen and nitrogen. Those skilled in the art would also recognize that elemental silicon is also not a polymer. Thus, Fleming et al. does not suggest the use of particles comprising an inert material or a polymer as stated by the Examiner, and any postulated suggestion by Fleming et al. to modify spectral properties by using an inert material or a polymer is not pertinent to these two claims. Therefore, applicants respectfully submit that the Examiner has not presented a proper *prima facie* case for obviousness of any of the claims 6, 33, 34, or 35 and that none of these claims would not have been obvious to a person of ordinary skill.

Regarding claim 7 specifically, the Examiner correctly states that Enokido et al. does not disclose a precursor material comprising a metal oxide. To provide the metal oxide missing from the disclosure of Enokido et al., the Examiner cites the use of tungsten by Fleming et al. (col. 6, lines 15-18). The material disclosed by Fleming et al. is tungsten (an elemental metal, not a metal oxide). Therefore, again, applicants respectfully submit that the Examiner has not presented a proper *prima facie* case for obviousness of claim 7 and that this claim would not have been obvious to a person of ordinary skill.

Regarding claims 26 and 27 specifically, the Examiner correctly states that Enokido et al. does not disclose a precursor material comprising a refractory metal. Fleming et al. (col. 6, lines 15-18) does disclose a refractory metal (tungsten). However, no combination of Enokido et al. and Fleming et al. would make the invention of claim 26, including all the limitations of claim 1 as amended. In particular, neither Enokido et al. nor Fleming et al. nor any of the prior art of record discloses forcing the particles into a combination having a desired crystallographic configuration by urging a slurry through an orifice. Therefore, neither claim 26 nor claim 27 would have been obvious in view of

any combination of Enokido et al. with Fleming et al. The same argument applies to claim 28, which recites tungsten or an alloy thereof.

Regarding claim 49 specifically, exactly the same argument applies as for claims 6, 33, 34, and 35 as discussed hereinabove. Claim 49 recites: "The method of claim 44, wherein the particles comprise an inert material." Regarding claim 49, the Examiner again states: "Fleming is cited to show a photonic crystal with particles comprising silicone, an inert material (col. 5, lines 53 – 56)." As noted above, the material disclosed by Fleming et al. (col. 5, lines 53 – 56), is not silicone, but the element silicon, which is disclosed in Fleming et al., not as inert particles, but as a complete photonic crystal structure. Silicon is not an inert material; it reacts chemically with many other substances, including oxygen and nitrogen. Thus, Fleming et al. does not suggest the use of particles comprising an inert material as stated by the Examiner, and any postulated suggestion by Fleming et al. to modify spectral properties by using an inert material is not pertinent to this claim. Therefore, applicants respectfully submit that the Examiner has not presented a proper *prima facie* case for obviousness of claim 49 and that claim 49 would not have been obvious to a person of ordinary skill.

For all of these reasons, applicants respectfully request that the rejections under 35 USC § 103(a) of claims 6 – 7, 26 – 28, 33 – 35, and 49 be withdrawn and respectfully request that these claims be allowed.

Claims 6 – 7, 26 – 28, 33 – 35, and 49 stand rejected under 35 USC § 103(a) as being unpatentable over Enokido et al. (2004/0255841) in view of Kudas et al. (2003/0175411). The Examiner cites no specific grounds for rejection of these claims. Claims 6 – 7, 26 – 28, 33 – 35, and 49 are discussed hereinabove. The Examiner has not rejected claims 9 or 10, but does refer to claims 9 and 10 in view of Enokido et al. and Kudas et al. For completeness of this response, claims 9 and 10 are discussed as follows: If the rejections were meant to be rejections under 35 USC § 103(a) of claims 9 and 10 as being unpatentable over Enokido et al. (2004/0255841) in view of Kudas et al. (2003/0175411), these rejections would be respectfully traversed. Dependent claims 9 and 10 depend upon claim 1. The premise

that Enokido et al. discloses the method of claim 1 is traversed hereinabove in the discussion of rejections under 35 USC § 102(e), where it has been shown that claim 1 is clearly distinguished from Enokido et al. Thus, both claims 9 and 10 have been distinguished clearly from Enokido et al.

Furthermore, regarding claims 9 and 10 specifically, no combination of Enokido et al. and Kudas et al. would make the invention of either claim 9 or claim 10, including all the limitations of claim 1 as amended. In particular, neither Enokido et al. nor Kudas et al. nor any of the prior art of record discloses *forcing the particles into a combination having a desired crystallographic configuration* by urging their slurry through an orifice. Therefore, neither claim 9 nor claim 10 would have been obvious in view of any combination of Enokido et al. with Kudas et al. Therefore, applicants respectfully request that any rejection of claims 9 and 10 under 35 USC § 103(a) as being unpatentable over Enokido et al. in view of Kudas et al. be withdrawn and that these claims be allowed.

This response is believed to be fully responsive to each issue raised in the office action, but if the Examiner maintains any rejection, applicant would appreciate a more detailed explanation of precisely where in the references the combination is suggested and the relevant limitations are disclosed.

Applicants expressly reserve the right to file divisional and/or continuation applications with any of the canceled or non-elected claims, or with similar claims, or with claims to any subject matter disclosed in the present application or incorporated by reference.

Applicants believe that the claims as amended are patentable over the prior art and respectfully request that the rejections be withdrawn and that the claims be allowed.

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Respectfully submitted,

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